

side greyish fawn-colour; both wings with transverse, pale-bordered, brown discocellular streak, a straight discal and a lunular submarginal band; the discal band on fore wing short, the discal band on hind wing straight till where it reaches the sinuous angle; two anal, black-centred, bright orange spots. Cilia whitish.

Exp.  $1\frac{3}{10}$  inch.

*Hab.* Masuri, N.W. Himalaya (*Capt. Lang*). In coll. F. Moore.

Distinguished from *D. ziha* (of which, at present, I know only the female) in the underside being differently coloured, the submarginal band on fore wing being uniform in colour and without the terminal spots, and in the discal transverse band on hind wing being quite straight to where the sinuous portion turns off to abdominal margin.

#### Fam. Hesperidæ.

##### *Pamphila Mencia.*

*Male* and *female*. Upperside dark glossy olive-brown: fore wing of male with a curved discal series of five small yellowish spots, and with a contiguous oblique prominent narrow streak; two small spots also at end of the cell: hind wing with a discal series of three indistinct spots. Female differs in the absence of the oblique narrow discal streak on fore wing and the spots on the hind wing. Underside paler, longitudinally streaked with grey; spots the same; sexual streak on male not visible.

Exp.  $1\frac{6}{10}$  inch.

*Hab.* Shanghai. In coll. W. B. Pryer and F. Moore.

In this species the wings are much broader than in *P. sinensis* (Mabille), and the hind wing is not lobed as in that species.

V.—*Report on the Crustacea collected by the Naturalists of the Arctic Expedition in 1875-76.* By EDWARD J. MIERS, F.L.S., F.Z.S., Assistant in the Zoological Department, British Museum.

[Plates III. & IV.]

THE Crustacea collected by the naturalists of H.M.S.S. 'Alert' and 'Discovery,' although not including many novelties, are of great interest on account of the high and hitherto unexplored latitudes reached by the late Arctic Expe-

dition. The number of species may appear small in comparison with the results of the late German expedition to the North Pole, or with those published in the Preliminary "Report of the Biological Results of the Cruise of the Valorous;" but in the case of the latter expedition the collections were made on the coast of Western Greenland and in Davis Straits, many degrees to the southward, and under conditions much more favourable to the production of animal life; and as regards the former, the species actually collected in the Polar Sea were few in number compared with those obtained on the east coast of Greenland.

In accordance with a suggestion of Captain Feilden, the following account of the collections of Crustacea is confined to the species collected between lat.  $78^{\circ}$  and  $84^{\circ}$  N. The few specimens of Crustacea brought home by the Expedition from localities south of  $78^{\circ}$  N. lat. which were in the collection intrusted to me, can be omitted without in any degree detracting from the chief interest of this report as an account of the fauna of a region hitherto unexplored by the carcinologist.

The most northerly species collected is *Anonyx nugax*, one of the commonest and most abundantly distributed of the Arctic Amphipoda, and first made known to science a hundred years ago by Phipps (Voy. toward the North Pole). Of this species a fine adult male example, and several smaller ones, were collected by Captain Markham and Lieut. Parr, at  $83^{\circ} 19'$  N. lat., in May 1876, at a depth of 72 fathoms (bottom mud, containing Foraminifera). The next most northerly species, a large specimen of the well-known *Hippolyte aculeata*, was found on the shore of Dumb-bell Harbour, Grinnell Land, in lat.  $82^{\circ} 30'$  N.

The following are the principal stations at which Crustacea were collected by the naturalists of the 'Alert' and 'Discovery':—

Floeberg Beach, the winter quarters of H.M.S. 'Alert,' from September 1875 to July 1876, in  $82^{\circ} 27'$  N. lat. Captain Feilden states that the only means of obtaining Crustacea at this point was by letting down baited nets through the firehole, and in July through cracks made in the floe.

Discovery Bay, winter quarters of the 'Discovery,' in  $81^{\circ} 44'$  N. lat. The Crustacea collected at this locality were obtained by dredging at a depth of  $5\frac{1}{2}$  to 25 fathoms, in August 1875–76. (The bottom rocky.)

Cape Fraser, Grinnell Land, in  $79^{\circ} 44'$  N. lat. Crustacea were collected at a depth of 20 fathoms, in August 1876. (Bottom stony.)

Dobbin Bay, Grinnell Land, in  $79^{\circ} 40'$  N. lat. The Crus-

tacea were collected at a depth of 30 fathoms, in August 1876. (Bottom consisting of stones and mud.)

Cape Louis Napoleon, a prominent headland of Grinnell Land, in lat.  $79^{\circ} 38' N$ . The Crustacea were obtained at a depth of 25 fathoms, in August 1876.

Franklin-Pierce Bay, Grinnell Land, in  $79^{\circ} 29' N$ . lat. Crustacea were collected at a depth of 15–20 fathoms, in August 1875.

Dr. Lütken, in his valuable "List of the Crustacea of Greenland," published in 1875, in the 'Manual of Instructions for the Arctic Expedition,' enumerates 184 species of Crustacea and Pycnogonida; and Norman, in the 'Report on the 'Valorous' Expedition,' gives 249 as the number of species belonging to the West-Greenland fauna alone, no fewer than 113 species having been collected in Davis Straits and on the west coast of Greenland by that Expedition. Only 31 species were collected by the Arctic Expedition in Smith Sound and the seas to the northward; whence it is evident that in the highest latitudes there is a great decrease in the number of *species* of Crustacea, which is but partially compensated for by the increase in number of the *individuals* of certain well-known species which attain a much larger size than specimens of the same species collected in lower latitudes. From the Table appended it appears that this decrease is mainly in the orders Amphipoda and marine Ostracoda. Of the latter group no species were collected by the naturalists of the 'Alert' and 'Discovery.'

The following Table exhibits, (I.) the number of species obtained during the 'Valorous' cruise on the west coast of Greenland and in Davis Straits; (II.) the number mentioned by Buchholz as occurring on the south and west coasts of Greenland; (III.) the number obtained by the British Arctic Expedition north of lat.  $78^{\circ} N$ . in Smith Sound and on the coasts of Grinnell Land:—

	I.	II.	III.
Brachyura .....	3		
Anomura .....	1		
Macrura .....	11	6	9
Stomatopoda .....	..	1	1
Cumacea .....	6		
Isopoda .....	7	2	4
Amphipoda .....	39	21	12
Phyllopoda .....	3	1	1
Ostracoda .....	34		
Copepoda .....	2	1	1
Cirripedia .....	4	1	1
Pycnogonida .....	3	3	2
	<hr/>	<hr/>	<hr/>
	113	36	31

Of actual novelties not many were obtained during the expedition. A marked variety (which may prove to be a distinct species, although I do not consider it as such) of *Arcurus baffini*, a new species of parasitic Copepoda of the genus *Lernæopoda*, occurring upon the gills of the new Charr described by Dr. Günther under the name of *Salmo arcturus*, and a variety of the well-known *Nymphon hirtum*, complete the list.

One of the most interesting species obtained is the extraordinary Isopod, *Munnopsis typica*, Sars, originally discovered at great depths in the fjords of Norway and at the Lofoten Islands, and since obtained at a depth of 100 fathoms in Davis Straits, during the cruise of the 'Valorous.' Of this species several specimens were obtained off Capes Fraser and Napoleon at 20–50 fathoms. *Cetochilus septentrionalis*, which was collected abundantly south of Smith Sound, was not found north of the entrance to that channel; but specimens of a delicate species of Phyllopoda, which I refer to the *Branchinecta arctica* of Verrill, were collected by Mr. Hart in a small freshwater lake and in a stream under ice so far to the northward as Discovery Bay.

*Geographical Distribution.*—This has been already discussed in some detail by Buchholz (*l. c.*). The Crustacean fauna of Greenland, Spitzbergen, and the Scandinavian peninsula has been so thoroughly elucidated of recent years, through the labours of the Danish, Swedish, and Norwegian naturalists, that it is not surprising that a large proportion of the Arctic species (including, as will be seen from the following Table, nearly all collected by the British expedition) should have been recorded from these localities. Comparatively few Arctic species inhabit the North British seas; nor is it probable that their number will be greatly increased, the Crustacea of the Shetlands having been carefully investigated by the Rev. A. M. Norman, in his recently published report on the dredging-operations carried on in these islands, and that of the coast of Scotland generally by the researches of local naturalists.

For our knowledge of the Crustacea inhabiting the coasts and islands of Arctic America, we have for data only the reports appended to the earlier British voyages to the Arctic regions, and for those of North-eastern Asia, Brandt's account of the Crustacea in Middendorff's 'Sibirische Reise,' vol. ii. While a large number of the species inhabiting the northern seas of Europe and Eastern America are probably restricted in their range to the North-Atlantic basin, I believe, when the Crustacea of the north coasts of America and Asia become better known it will be found that the hardier species, which

*Geographical Distribution of the Crustacea collected by the Arctic Expedition North of Lat. 78° N.*

Names of the Species collected.	Greenland†.	Arctic America†.	Iceland.	Spitzbergen.	Scandinavia.	Britain.	N. E. Asia.	Other localities.
<b>DECAPODA.</b>								
<i>Cheraphilus boreas</i> .....	*	*	*	*	*	*	*	California.
<i>Sabinea septemcarinata</i> .....	*	*	*	*	*	*	*	
<i>Hippolyte Gaimardii</i> .....	*	*	*	*	*	*	*	
— <i>spinus</i> .....	*	*	*	*	*	*	*	
— <i>turgida</i> .....	*	*	*	*	*	*	*	
— <i>Phippsii</i> .....	*	*	*	*	*	*	*	
— <i>polaris</i> .....	*	*	*	*	*	*	*	
— <i>borealis</i> .....	*	*	*	*	*	*	*	
— <i>greenlandica</i> .....	*	*	*	*	*	*	*	
<b>STOMATOPODA.</b>								
<i>Mysis oculata</i> .....	*	*	*	*	*	*	*	
<b>ISOPODA.</b>								
<i>Arcturus baffini</i> .....	*	*	*	*	*	*	*	Färö Islands.
— —, var. <i>Feildeni</i> .....	*	*	*	*	*	*	*	
<i>Gyge hippolytes</i> .....	*	*	*	*	*	*	*	
<i>Phryxus abdominalis</i> .....	*	*	*	*	*	*	*	
<i>Munnopsis typica</i> .....	*	*	*	*	*	*	*	Davis Straits.
<b>AMPHIPODA.</b>								
<i>Anonyx nugax</i> .....	*	*	*	*	*	*	*	
— <i>gulosus</i> ? .....	*	*	*	*	*	*	*	South Europe ?
<i>Onesimus Edwardsii</i> .....	*	*	*	*	*	*	*	
<i>Atylus carinatus</i> .....	*	*	*	*	*	*	*	
<i>Acanthozone hystrix</i> .....	*	*	*	*	*	*	*	
<i>Halirages fulvocinctus</i> .....	*	*	*	*	*	*	*	
<i>Gammarus locusta</i> .....	*	*	*	*	*	*	*	South Europe.
<i>Gammaracanthus loricatus</i> .....	*	*	*	*	*	*	*	
<i>Amathilla pinguis</i> .....	*	*	*	*	*	*	*	
<i>Eusirus cuspidatus</i> .....	*	*	*	*	*	*	*	
<i>Tritropis aculeata</i> .....	*	*	*	*	*	*	*	
<i>Egina spinosissima</i> .....	*	* <sup>p</sup>	*	*	*	*	*	Great Manan, Colorado.
<b>PHYLLOPODA.</b>								
<i>Branchipus (Branchinecta) arcticus</i> .....	*	*	*	*	*	*	*	
<b>COPEPODA.</b>								
<i>Lernæopoda arcturi</i> , n. ....	*	*	*	*	*	*	*	
<b>CIRRIPEDIA.</b>								
<i>Balanus porcatus</i> .....	*	*	*	*	*	*	*	Maine, Massachusetts; China?
<b>PYCNOGONIDA.</b>								
<i>Nymphon hirtum</i> .....	*	*	*	*	*	*	*	
— —, var. <i>obtusidigitum</i> ..	*	*	*	*	*	*	*	
— <i>Strömii</i> .....	*	*	*	*	*	*	*	

† Including the Crustacean fauna of the southern, western, north-eastern, and eastern coasts. For information with respect to the particular species inhabiting these coasts I must refer to the table given by Buchholz (*l. c.*).

‡ With particular reference to the northern coasts and islands adjacent. These localities are important as showing the tendency to a circumpolar distribution observable in many species, and are not given by Buchholz. Further particulars are mentioned in the text.

increase in size and number as regards individuals in the highest latitudes, range over a zone comprehending the whole circumpolar or *Arctic* region, as has been already suggested by Dana, in the second volume of his work on the Crustacea collected by the United-States Exploring Expedition under Commodore Wilkes (pp. 1554, 1579), corresponding to the *Antarctic* region of the same author.

It has been thought useful to give, in the synonyma, full references to the earlier British Polar voyages and Arctic expeditions wherein lists of the Crustacea collected are published; but reference is only made to the principal works of the Danish and Scandinavian naturalists, by whose labours our knowledge of the lower orders of the Crustacea has been so greatly increased.

A small collection of Crustacea made by A. C. Horner, Esq., while on board the yacht 'Pandora,' which has been placed in my hands for examination, contains only two species collected north of lat.  $78^{\circ}$ , *i. e.* three specimens of *Atylus carinatus*, and four very small specimens of an Amphipod, perhaps belonging to the genus *Pherusa*. Both these species were collected at a depth of 7 fathoms on a clay bottom, in Pandora Harbour, Smith Sound, in lat.  $78^{\circ} 17' N$ .

## DECAPODA.

### CRANGONIDÆ.

#### *Cheraphilus boreas*.

*Cancer boreas*, Phipps, Voy. North Pole, p. 190, pl. xii. fig. 1 (1774).

*Cancer homaroides*, O. Fabr. Fauna Grœnlandica, p. 241 (1780); Mûhr, Isl. Naturh. p. 108. no. 245, pl. v. (1786).

*Crangon boreas*, Fabr. Ent. Syst. Suppl. p. 410 (1798); Sabine, Parry's 1st Voy. Append. no. x. p. 57 (1821); Ross, Append. Capt. Parry's 3rd Voy. p. 120 (1826); 4th Voy. p. 205 (1828); Ross and Owen, Crust. in Append. Ross 2nd Voy. p. lxxxix (1835); M.-Edw. Hist. Nat. Crust. ii. p. 342 (1837); Krøyer, Nat. Tidsskr. iv. p. 218, pl. iv. figs. 1-14 (1842-43); Brandt, Crust. in Middendorff's Sibirische Reise, p. 114 (1851); Bell, Crust. in Belcher, 'Last of the Arctic Voyages,' ii. p. 402 (1855); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarfahrt, ii. p. 271 (1874).

*Cheraphilus boreas*, Kinahan, Proc. Royal Irish Acad. viii. p. 68 (1864).

Coll. Feilden: Discovery Bay, lat.  $81^{\circ} 44'$  (both males and females), at depth of 25 fathoms; Cape Napoleon, one male example, at 25 fathoms; Franklin-Pierce Bay, one female, at 15 fathoms: temperature of water  $29^{\circ} 50$ .

In the large series of this species collected, the females are uniformly larger than the males and more robust, the frontal lobe,

the spines at the antero-lateral margins of the carapace, and the teeth of the median dorsal carina less prominent and acute; the outer lamina of the antennæ is of a more broadly oval shape; the inner ramus of the first to fifth pairs of the postabdominal appendages, which in the male is quite small, in the female is, with the outer ramus, flattened and largely developed, and furnished with long marginal cilia, to which the ova adhere by the viscous matter which retains the whole mass *in situ*. The length of the largest female slightly exceeds 4 inches (103 millims.); that of the largest male is only  $2\frac{2}{3}$  inches (68 millims.). The dark purple longitudinal stripes on the segments of the postabdomen are generally much more distinct in the males than in the females.

This species is found in great abundance throughout the high northern and Arctic latitudes—occurring upon the Scandinavian coasts, Greenland, Iceland, Spitzbergen, the north coast of North America (Port Bowen, Igloodik, Felix Harbour, Melville Island), and Kamtschatka. California, I may add, is mentioned as a habitat of this species by Owen and Ross in the Appendix to Ross's Second Voyage, on the authority of specimens collected during the voyage of the 'Blossom.'

*Sabinea septemcarinata*.

*Crangon septemcarinatus*, Sabine, Append. no. x. of Capt. Parry's 1st Voy. p. 58, pl. ii. figs. 11–13 (1821); Ross, Append. Capt. Parry's 4th Voy. p. 205 (1828); Milne-Edw. Hist. Nat. Crust. ii. p. 343 (1837); Brandt, Crust. in Middendorff, Sibirische Reise, p. 114 (1851).

*Sabinea septemcarinata*, Owen and Ross, Crust. in Append. Ross's 2nd Voy. p. lxxxii (1835); Miers, Ann. & Mag. Nat. Hist. (ser. 4) xix. p. 133 (1877).

*Sabinea (Crangon) septemcarinata*, Krøyer, Nat. Tidsskr. iv. p. 244, pl. iv. figs. 34–40, pl. v. figs. 41–44 (1842–43).

Coll. Feilden: Discovery Bay, 25 fathoms, abundantly, both males and females; Cape Napoleon, 25 fathoms, three specimens, males.

Coll. Hart: Dobbin Bay, at a depth of 30 fathoms, one specimen, a female with ova.

The differences between the sexes in *S. septemcarinata* are less marked than in the preceding species. The females are but little larger than the males; and the rami of the appendages of the postabdomen differ but slightly in the two sexes (see Krøyer, Nat. Tidsskr. l. c. figs. 43, 44). In small specimens the fourth segment of the postabdomen has a small spine at its infero-lateral angle, which is usually absent in the adult. Among the large number of specimens collected there is but a single female with ova. Length of this, the largest specimen, 2 inches 6 lines (nearly 64 millims.).

This species is probably as widely, but less abundantly distributed than *C. boreus* throughout the circumpolar region. It occurs on the coasts of Arctic America (Igloodik, Felix Harbour), the Shetlands, Norway, Greenland, and Spitzbergen; and its range extends eastward to Kamtschatka (Ryan).

## ALPHEIDÆ.

*Hippolyte Gaimardii*.

- Hippolyte Gaimardii*, Milne-Edw. Hist. Nat. Crust. ii. p. 378 (1837); Krøyer, Nat. Tidsskr. 1 R. iii. p. 572 (1840-41); Monogr. Fremst. Slægt. Hippolyte's nordiske Arter, p. 74, pl. i. figs. 21-29 (1842); Goës, Cefv. Vet. Akad. Förhandl. p. 168 (1863).  
*Hippolyte gibba*, Krøyer, Nat. Tidsskr. 1 R. iii. p. 572 (1840-41); Monogr. Slægt. Hippolyte's nord. Arter, p. 80, pl. i. fig. 30, pl. ii. figs. 31-37 (1842).  
 ? *Hippolyte Belcheri*, Bell, Crust. in Belcher, 'Last of the Arctic Voyages,' ii. p. 402, pl. xxxiv. fig. 1 (1855).

Coll. Hart: Franklin-Pierce Bay, 13-15 fathoms, one female specimen.

A single specimen (female with ova) was collected by Mr. Hart. Length 2 inches 2 lines (55 millims.). The front margin of the carapace is armed with two spines—one below the eyes, and one (very small) at the junction of the anterior and inferior margins of the carapace. The rostrum slightly exceeds in length the scale of the antennæ, is slightly directed upward at the distal extremity, and is  $\frac{9}{4}$ -toothed, the teeth on the upper margin becoming more crowded toward the distal extremity. The third segment of the postabdomen is without a compressed dorsal carina. The eyes are obconical. The outer maxillipeds do not reach to the apex of the antennal scale.

The dorsal tubercle or carina is, according to Goës (*l. c.*), generally characteristic of the males of this species, to which he refers the *H. gibba* of Krøyer and *H. Belcheri* of Bell.

*Hippolyte Gaimardii* is very generally distributed on the high-northern coasts and islands of Europe. It has been recorded from the shores of Norway, Finmark, Spitzbergen, Iceland, Greenland; also Arctic America, if the *H. Belcheri* of Bell belong to this species. Its author describes it as having but "a single tooth at the outside of the orbilar notch."

*Hippolyte spinus*.

- Cancer spinus*, Sowerby, Brit. Miscell. p. 47, pl. xxiii. (1806).  
*Alpheus spinus*, Leach, Ed. Encycl. vii. p. 431 (1813-14); Linn. Trans. xi. p. 347 (1815).  
*Hippolyte Sowerbei*, Leach, Mal. Pod. Brit. pl. xxxix. (1815-17).  
*Hippolyte Sowerbei*, Owen and Ross, Crust. in Append. Ross 2nd Voy. p. lxxxiii, pl. B. fig. 2 (1835); Krøyer, Monogr. Fremst. Slægt. Hippolyte's nord. Arter, p. 90, pl. ii. figs. 45-54 (1842).  
*Hippolyte Sowerbyi*, M.-Edw. Hist. Nat. Crust. ii. p. 380 (1837).  
*Hippolyte spinus*, Bell, Brit. Crust. p. 284 (1855).

Coll. Feilden: Discovery Bay, 5 specimens, at 25 fathoms.

This species is distinguishable at first sight by its compressed lamellate rostrum, the high and strongly dentated median dorsal carina, &c. As in *Hippolyte turgida*, there are four spines upon the



anterior margin of the carapace, two of which are placed above the eye-peduncle. The length of the largest specimen is 2 inches 4 lines (59 millims.). All the specimens in the collection are females; but only one bears ova.

*H. spinus* occurs on the British and Scandinavian coasts, at Greenland, Spitzbergen, and on the shores of Arctic America (Felix Harbour).

#### *Hippolyte turgida.*

*Hippolyte turgida*, Krøyer, Monogr. Fremst. Slægt. Hippolyte's nordiske Arter, p. 100, pl. ii. figs. 57-58, pl. iii. figs. 59-63 (1842); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarf. p. 273 (1874).

Coll. Feilden: Discovery Bay, 25 fathoms, one specimen, female; Franklin-Pierce Bay, one specimen, female with ova.

Coll. Hart: Cape Fraser, 20 fathoms, one female example.

This species is remarkable on account of the turgid form of the body, and the convexity of the dorsal surface of the carapace. From *H. polaris* (with some varieties of which species it might be confounded on first comparison) it is distinguished by the existence of an additional spine upon the anterior margin of the carapace above the eye-peduncle. The only perfect example obtained (a female) has the rostrum  $\frac{1}{6}$ -toothed. Length about 1 inch 10 lines (47 millims.).

Goës, who had examined 100 specimens of this species, did not find a single male in the series; and he considered it to be the female of the *Hippolyte Phippsii* of Krøyer. By Buchholz the differences are not regarded as sexual, as he states that he had observed two male individuals of *H. turgida*, and a female of *H. Phippsii*; but he nevertheless considers the two forms probably varieties of one and the same species.

Although this species has not been noted by any of the earlier Arctic voyagers, it may not improbably, in some instances, have been confounded with *H. polaris*, to which, as stated above, it bears some external resemblance.

Its occurrence has been recorded on the coasts of Greenland, Spitzbergen, and Norway.

#### *Hippolyte Phippsii?*

? *Hippolyte Phippsii*, Krøyer, Nat. Tidsskr. 1 R. iii. p. 575 (1840-41); Monogr. Fremst. Slægt. Hippolyte's nordisk. Arter, p. 106, pl. iii. figs. 64-68 (1842); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarf. p. 274 (1874).

Coll. Hart: Cape Fraser, 20 fathoms, one specimen.

A single specimen of a species of *Hippolyte* is in the collection, which I refer with but little hesitation to this species. The only point in which it differs from Krøyer's diagnosis is in the absence of the second minute supraocular spine; and this may well be a point of less than specific importance.

The rostrum is slender and straight, of the form figured by Krøyer (*l. c.*), and has ten very small teeth on its upper and five near the distal extremity of its inferior margin. Length nearly 1 inch 4 lines (33 millims.).

This species is found on the shores of Finmark, Spitzbergen, and Greenland.

*Hippolyte polaris.*

*Alpheus polaris*, Sabine, Append. Parry's 1st Voy. no. x. p. 60, pl. ii. figs. 5-8 (1821); Ross, Append. Parry's 4th Voy. p. 206 (1828).

*Hippolyte polaris*, Ross and Owen, Append. Ross's 2nd Voy. Zool. Crust. p. lxxxv (1835); M.-Edw. Hist. Nat. Crust. ii. p. 376 (1837); Krøyer, Monogr. Fremst. Slægt. Hippolyte's nordiske Arter, p. 116, pl. iii. figs. 78-81, pl. iv. fig. 82 (1842); Bell, in Belcher, 'Last of the Arctic Voyages,' ii. p. 401 (1855); Goës, Cefv. Vet. Akad. Förhandl. p. 169 (1863); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarf. p. 275 (1874).

Coll. Feilden: Discovery Bay, 25 fathoms, abundant; Cape Napoleon, five specimens; Franklin-Pierce Bay, 15 fathoms, two specimens.

Coll. Hart: Franklin-Pierce Bay, 13-15 fathoms, several specimens; Dobbin Bay, 30 fathoms, one specimen.

In this species there are three or four spines in a median series on the back of the carapace, and three spines upon its anterior margin, one above and one below the eyes, and one at the junction of the anterior and inferior margins. The rostrum is toothed above and below, and acute at the extremity, which is directed somewhat upward. The number of teeth on the upper and lower margins, however, is very variable, averaging 7-9 on the upper, and 3-4 on the lower margin. In one specimen the rostral teeth =  $\frac{19}{5}$ , in another  $\frac{9}{3}$ . Krøyer, in the diagnosis of this species in his monograph of the genus *Hippolyte* (p. 121), gives  $\frac{6-7}{2-3}$  as the number of the rostral teeth; but this is somewhat below the average. The length of the largest specimen (a female with ova) is 2 inches 7 lines (66 millims.). In this specimen the rostral teeth =  $\frac{9}{8}$ .

I have observed no distinctive sexual characters in the individuals collected, although a greater number were obtained of this species than of any other in the genus. There are a large number of females with ova; and perhaps all the specimens are of this sex. According to Buchholz, who observed a nearly equal number of specimens of both sexes, the females are generally larger than the males, and have the upper antennæ shorter.

This species occurs abundantly on the coasts of Greenland and Spitzbergen, and is also found on the shores of Norway and the Province of Finmark and Arctic America (Melville Island).

*Hippolyte borealis.*

*Hippolyte borealis*, Owen, Append. Ross's 2nd Voy. Crust. p. lxxxiv, pl. B. fig. 3 (1835); M.-Edw. Hist. Nat. Crust. ii. p. 372 (1837)

Krøyer, Monogr. Fremst. Slægt. Hippolyte's nordiske Arter, p. 122, pl. iii. figs. 74-77 (1842); Bell, in Belcher, 'Last of the Arctic Voyages,' ii. p. 400 (1855); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarfahrt, p. 276 (1874).

Coll. Feilden : Discovery Bay, at 25 fathoms, several specimens ; Cape Napoleon, at 25 fathoms, two specimens ; Franklin-Pierce Bay, at 15 fathoms, three specimens.

Coll. Hart : Franklin-Pierce Bay, 13-15 fathoms, four specimens ; Dobbin Bay, 30 fathoms, one specimen.

This species is characterized by its elongate, slender, horizontal rostrum, the upper margin of which is straight and entire ; upon the lower margin, near the apex, there are usually 3-4 small teeth ; in several specimens there are 5, in one or two specimens only 2 teeth on the lower margin. There are two spines on the anterior margin of the carapace, one above and one below the eye. Length of the largest specimen collected, 2 inches 3 lines (57 millims.).

There is not among the specimens of this species a single female with ova ; it is probable that all are of the male sex. No females were collected by the German Arctic Expedition, under Captain Koldewey : and Goës (Æfv. Vet. Ak. Förhandl. 1863, p. 170) states that he has never observed any among the large number of specimens examined by him.

By Goës (Æfv. Vet. Ak. Förh. p. 170, 1863) this species is considered identical with *H. polaris* ; and by Buchholz (*l. c.*) it is not thought to be more than a variety. That the differences between the two forms are not sexual, as might have been surmised, would seem to be proved by the fact that Buchholz mentions the occurrence of males and females of *H. polaris* in nearly equal numbers. For the present I think it desirable to regard the two forms as distinct species. The differences are at least as great as those between many other species of the genus ; and no strictly intermediate varieties have been observed.

The geographical range of *H. borealis* is the same as that of *H. polaris*.

#### *Hippolyte grønlandica*.

*Astacus grønlandicus*, J. C. Fabricius, Syst. Ent. p. 416 (1775).

*Cancer aculeatus*, O. Fabr. Fauna Grønlandica, p. 289 (1780).

*Alpheus aculeatus*, Sabine, Zool. in Append. Parry's 1st Voy. p. 59, pl. ii. figs. 9, 10 (1821) ; Ross, Append. Parry's 3rd Voy. p. 120 (1826) ; 4th Voy. p. 206 (1828).

*Hippolyte aculeata*, Owen and Ross, Crust. in Append. Ross's 2nd Voy. p. lxxxiii (1835) ; M.-Edw. Hist. Nat. Crust. ii. p. 380 (1837) ; Owen, Crust. in Beechey's Voy. 'Blossom,' p. 88 (1839) ; Krøyer, Monogr. Fremst. Slægt. Hippolyte's nordiske Arter, p. 126, pl. iv. figs. 83-98, pl. v. figs. 99-104 (1842) ; Brandt, in Middendorff, Sibirische Reise, Krebse, p. 118 (1851) ; Bell, Crust. in Belcher, 'Last of the Arctic Voyages,' p. 401 (1855).

*Hippolyte armata*, Owen, Crust. in Beechey's Voy. 'Blossom,' p. 88, pl. xxvii. fig. 2 (1839), ♀.

*Hippolyte cornuta*, Owen, Crust. Beechey's Voy. 'Blossom,' p. 89, pl. xxviii. fig. 2 (1839), ♂.

Coll. Feilden : Dumb-Bell Harbour, lat.  $82^{\circ} 30'$ , one female specimen.

Coll. Hart : Franklin-Pierce Bay, 13-15 fathoms, one male specimen.

In this species the rostrum is short and slender, there is a strongly 4-dentate median dorsal carina, three strong spines on the anterior margin of the carapace, and the segments of the postabdomen are strongly spined upon their inferior lateral margins. The largest specimen collected has the rostrum, anterior to the front margin of the carapace,  $\frac{2}{3}$ -toothed; the length of this specimen is 2 inches 10 lines (72 millims.). In the male, length 2 inches 4 lines (59 millims.), the segments of the postabdomen (especially the second segment) are narrower on the sides, and the lateral spines much longer.

*H. greenlandica* occurs on the coasts of Greenland, Arctic America (Port Bowen, Melville Island), and in the seas of Kamtschatka and Okhotsk.

## STOMATOPODA.

### MYSIDÆ.

#### *Mysis oculata*.

*Cancer oculatus*, O. Fabr. Fauna Grœnlandica, p. 245. no. 222 (1780).

*Mysis Fabricii*, Leach, Trans. Linn. Soc. xi. p. 350 (1815).

*Mysis oculata*, Krøyer, Nat. Tidsskr. ii. p. 255 (1838-9); 3 R. i. pp. 13, 41 (1861); Voy. en Scand. Crust. Atlas, pl. viii. fig. 2; Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarf. p. 284 (1874).

Coll. Feilden : Cape Napoleon, 25 fathoms (temperature of water  $29^{\circ}.2$ ).

The single specimen collected is in a very much mutilated condition. Its length is nearly 10 lines (20 millims.).

It occurs on the coasts of Greenland and Spitzbergen.

## ISOPODA.

#### *Arcturus baffini*.

*Idotea baffini*, Sabine, Append. Capt. Parry's 1st Voy. p. 50, pl. i. fig. 4-6 (1821); Ross, Append. Capt. Parry's 3rd Voy. p. 117 (1826); 4th Voy. p. 203 (1828).

*Arcturus tuberculatus*, Latr. in Cuvier's Règne Animal (ed. 2), iv. p. 139 (1829).

*Arcturus baffini*, Westwood, Trans. Entom. Soc. Lond. i. p. 72 (1836); M.-Edw. Hist. Nat. Crust. iii. p. 123, pl. xxxi. fig. i. (1840); Bell, in Belcher, 'Last of the Arctic Voyages,' ii. p. 408 (1855).

Coll. Feilden : Cape Napoleon, at 25 fathoms, two specimens, male and female.

Coll. Hart : Dobbin Bay, 30 fathoms, one male and one female; Franklin-Pierce Bay, 13-15 fathoms, four males and one female; same locality, depth not stated, two females and many young.

Two very distinct varieties of this species are in the collection.

In one, which may be considered the typical, and which is probably also the commonest condition of the species, the body is of a compact, robust form; the head, and each of the segments of the body, is armed with a pair of conical erect spines, which are smaller upon the posterior segments; on the terminal segments, in lieu of spines, are two small tuberculiform prominences. The coxæ of the last three pairs of legs project laterally, and are acute at the extremity. The spines vary considerably in size; in the largest individual, a female, obtained by Mr. Hart at Franklin-Pierce Bay, length nearly 2 inches 6 lines (63 millims.), the spines on some of the segments are reduced to little more than prominent tubercles. This specimen bears a thickly clustered brood of young upon the peduncles of the large outer antennæ; in these young individuals scarcely any traces exist of tubercles or spines; they average  $3\frac{1}{2}$  lines in length.

Var. *Feildeni*. Pl. III. fig. 1.

Coll. Feilden: Floeberg beach,  $82^{\circ} 27'$  N. lat., very abundant, males, females, and young; near winter quarters of H.M.S. 'Alert,'  $82^{\circ} 26' 22''$  N. lat., one specimen.

In this variety, to which belong the specimens from Floeberg beach, the head and first four segments of the body are smooth, or with only the most obscure indications of tubercles; on the fifth to seventh segments, and on the first two postabdominal segments is a pair of small tubercles occupying the place of the prominent spines of the preceding variety; the terminal segment is usually quite smooth; the coxæ of the last three pairs of legs are less prominent and acute than in that which I have considered the typical form of the species. In the young animals (of which a large number were collected), the tubercles on the first four segments are sometimes clearly distinguishable. Adult specimens of both sexes were collected, the males in greater abundance. It is worthy of note, that among all the specimens collected at this locality not one exhibits any approach to the variety from Cape Napoleon.

This variety cannot, however, be regarded as a distinct species, on account of the tendency to variation in the length of the spines of the preceding form; there is, moreover, in the collection of the British Museum a specimen from Baffin's Bay, in which the spines upon all the segments are reduced to tubercles.

This common Arctic species occurs on the northern coast of America (Port Bowen), at Spitzbergen, the Färö Islands, and Iceland.

#### *Gyge hippolytes*.

*Bopyrus hippolytes*, Krøyer, Kongl. Dansk. Vidensk. Selsk. Afhandl. vii. p. 306, pl. iv. fig. 22 (1838); Voy. en Scand. Atlas, Crust. pl. xxviii. fig. 2 ♂ & ♀; M.-Edw. Hist. Nat. Crust. iii. p. 283 (1840).

*Gyge hippolytes*, Spence Bate and Westwood, Hist. Brit. Sessile-eyed Crust. ii. p. 230 (1868); Buchholz, in Koldewey, Zweite deutsche Nordpolarfahrt, Crust. p. 286 (1874).

Coll. Feilden : Discovery Bay (on *Hippolyte polaris*).

A male and female example of this curious Bopyrid Crustacean occurred in the collection, parasitic upon a specimen of *Hippolyte polaris*, and occupying the position in which it is usually found, *i. e.* a cavity beneath the carapace, at the angle formed by the junction of the posterior and lateral margins (*vide* Buchholz, 'Zweite deutsche Nordpolarfahrt,' Crust. p. 286). This cavity was nearly filled with the minute yellowish ova of the parasite. The animal agrees in all respects with the excellent figure given by Kröyer (Voy. en Scandinavie, pl. xxviii. fig. 2), except that in the minute male I have examined the body is more closely articulated, and the sutures defining the first two postabdominal segments are distinctly visible under the microscope. The length of the female is nearly 5 lines (10 millims.), that of the male about 1 line (2 millims.).

The *Gyge hippolytes* occurs, if we may judge from the few recorded localities, over a very extended geographical area; its existence has probably been unnoticed in many instances by the earlier observers. It occurs on the coasts of Greenland and Spitzbergen (on *Hippolyte polaris*), Norway (on *H. Sowerbæi*), and the British coasts, at Galway (on *H. varians*) and Cornwall.

#### *Phryxus abdominalis*.

*Bopyrus abdominalis*, Kröyer, Nat. Tidsskr. iii. pp. 102, 289, pls. i., ii. (1840); Voy. en Scand. Crust. Atlas, pl. xxix. fig. 1.

*Phryxus hippolytes*, Rathke, Nova Acta Nat. Curios. xx. p. 40, pl. ii. figs. 1-10 (1843).

*Phryxus abdominalis*, S. Bate and Westwood, Hist. Brit. Sessile-eyed Crust. ii. p. 234 (1868); Buchholz, Crust. in Koldewey, Zweite deutsche Nordpolarfahrt, p. 287 (1874).

Coll. Feilden : Discovery Bay, male and female, on *Hippolyte polaris*; Cape Napoleon, male and female, on *H. polaris*.

Coll. Hart : Franklin-Pierce Bay, 13-15 fathoms, five males and five females.

The females in the collection were found in the usual position beneath the second and third postabdominal segments of the *Hippolyte*, and the minute male was in each instance detected upon the body of the female.

It occurs frequently on the coasts of Norway and Finmark (on several species of *Hippolyte* and *Pandalus annulicornis*), Greenland (on *H. turgida*), Spitzbergen, and the northern, eastern, and southern coasts of Britain (on *Hippolyte pusiola*, *H. Barleei*, and *Pandalus annulicornis*). Its range is evidently quite as extended as that of the foregoing species.

#### *Munnopsis typica*.

*Munnopsis typica*, Sars, Forhandl. Vidensk.-Selsk. Christiania, p. 84 (1861); Bidrag til kundskab om Christiania-Fjordens Fauna, p. 70, pls. vi., vii. (1868).

Coll. Feilden : Cape Napoleon, two male specimens at a depth of 25 fathoms, temperature of the water 29°·2; at 50 fathoms one male specimen.

Coll. Hart : Cape Fraser, 20 fathoms, one female specimen.

The specimens collected of this very remarkable species, which has been fully described and illustrated by the late Dr. M. Sars in the memoir above referred to, are unfortunately all much mutilated ; in none are the antennæ and slender and greatly elongated legs of the third and fourth pairs in a perfect condition.

The largest specimen, the female from Cape Fraser, has the ovigerous plates greatly developed, and is about  $9\frac{1}{2}$  lines (18 millims.) long.

This species has been found at a depth of 50–100 fathoms in the Christiania Sound, and at a depth of 250 fathoms at the Lofoten Islands. It is also recorded by Buehholz (Crust. in 'Zweite deutsche Nordpolarf.' p. 285, note) from Spitzbergen, and was obtained during the cruise of the 'Valorous,' in lat.  $69^{\circ} 31' N.$ , long.  $56^{\circ} 1' W.$ , at a depth of 100 fathoms.

[To be continued.]

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VI.—*Note on Lists of Arctic Hydroïda and Polyzoa published in the 'Annals' for February 1874 and January 1877\*.*

By the Rev. THOMAS HINCKS, B.A., F.R.S.

IN the first of the papers referred to above I have given an account of some Hydroïds which were obtained by Dr. Wallich, as I supposed, off the coast of Iceland. In the second some Polyzoa which formed part of the same gathering were catalogued and several new species described.

The bottle containing the dredging, which was placed in my hands by Mr. Busk, was labelled legibly, "Off Reykjavik, in 100 fathoms, amongst icebergs grounded and drifting," or to this effect ; and I had no reason whatever to suspect inaccuracy. Since the publication of the second paper, however, Dr. Wallich, whose attention had not been previously directed to the matter, has informed me that there has undoubtedly been some blunder, inasmuch as there is no water of the depth off Reykjavik, nor are there any icebergs †. He has kindly examined his journals, notes, &c. for the purpose of removing, if possible, the doubt as to the locality ; and his conclusion is that the material with which I have dealt in my

\* "On Deep-water Hydroïda from Iceland," *Annals*, Feb. 1874, p. 146 ; "On Polyzoa from Iceland and Labrador," *Annals*, Jan. 1877, p. 97.

† Dr. Wallich writes (*in litt.*), "At Rekiavik Harbour I dredged *not* from the ship, but from a boat. In no part of the harbour did I find deeper water than about 20 fathoms. I do not believe there is much deeper water within half a mile of the little town ; and beyond this range I did not go. The harbour is a bay in no sense comparable to a fiord, the shore being sloping, and flat, low islands scattered here and there. A berg *could* not get into the harbour. Even outside the mouth of the bay, southward of Cape Rekianness, no icebergs are ever in these days met with."